

Autonomous Utility Connector for Lunar Surface Systems, Phase I

Completed Technology Project (2009 - 2009)



Project Introduction

Lunar dust has been identified as a significant and present challenge in future exploration missions. The interlocking, angular nature of Lunar dust and its broad grain size distribution make it particularly detrimental to mechanisms with which it may come into contact. Honeybee Robotics Spacecraft Mechanisms Corporation (HRSMC) seeks to develop a dust-tolerant, autonomous connector to transmit data and power on Lunar surface systems. HRSMC has extensive heritage in developing mechanisms for extreme and dusty environments, including the development of a dust-tolerant electrical connector prototype and a dust-tolerant mechanical connector concept. There are many near-term applications of such a connector including: the utility and electrical connections that will be used on the next-generation Lunar EVA suit, cryogenic utility connections that will be used to pass liquid hydrogen and liquid oxygen during in-situ resource utilization (ISRU) activities, and high-power electrical connectors capable of thousands of cycles for Lunar Surface Mobility Unit (LSMU) battery recharge and data transfer. As noted in current Lunar architectural options, human EVA's, long range Lunar rovers, and ISRU activities are on the mission horizon and are paramount to the establishment of a permanent human base on the Moon. In Phase I, HRSMC will baseline prior dust-tolerant connector work to develop a conceptual design for an autonomous, dust-tolerant, re-usable connector to enable electrical transfer between a LSMU and a central resource outpost or a deployed solar power unit. This connector would be easily adaptable to the needs of other Lunar surface system utility connectors required for EVA suits or other systems such as ISRU utility connections. This development path will result in an autonomous Lunar dust-tolerant electrical connector with a TRL level of 3-4 at the end of Phase 1 with a goal of at least TRL 6 at the end of Phase II.



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Organizational
Responsibility**Responsible Mission
Directorate:**

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

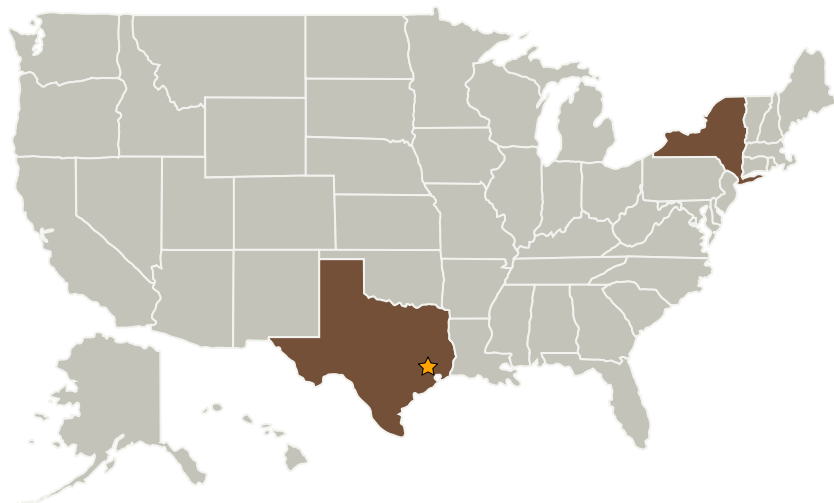
Small Business Innovation
Research/Small Business Tech
Transfer

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Primary U.S. Work Locations and Key Partners



Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.2 Launch Vehicle Propellant

Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Honeybee Robotics, Ltd.	Supporting Organization	Industry	Pasadena, California

Primary U.S. Work Locations

New York	Texas
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